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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,783	12/17/2003	Fumikane Honjou	67471-033	4690

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Washington, DC 20005-3096

EXAMINER
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ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/736,783

Applicant(s)

HONJOU ET AL.

Examiner

Maureen G. Arancibia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/03; 02/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 12 and 13 are objected to because of the following informalities: Line 5 of Claim 12 should be corrected to read "the sample chamber". Claim 13 is objected to due to its dependence on Claim 12. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3 and 6-8 rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of U.S. Patent 6,613,587 to Carpenter et al.**

AAPA teaches a plasma processing apparatus (Figure 1), comprising: a plasma chamber 607 in which a high-density plasma is generated; a sample chamber 601 in communication with the plasma chamber for housing a sample 603 to be processed using the plasma; and a protection tube 620 for protecting an inner wall of the plasma chamber from deposition of a product that results from the plasma processing.

AAPA does not expressly teach that the protection tube is composed of a plurality of pieces.

Carpenter et al. teaches that a protection tube 30 is composed of a plurality of pieces 31-38 that can differ in length. (Figure 2)

It would have been obvious to one of ordinary skill in the art to modify the protection tube taught by AAPA for it to be composed of a plurality of pieces of varying length. The motivation for making such a modification, as taught by Carpenter et al. (Column 1, Lines 45-57; Column 4, Lines 5-22), would have been to allow damaged sections of the protection tube to be replaced without having to replace the entire protection tube and without having to disassemble the plasma chamber. One of ordinary skill in the art would have been further motivated to vary the lengths of the plurality of pieces in order to differentiate them from each other, and to make sure that the damaged sections are replaced with the matching replacements.

In regards to Claim 2, AAPA teaches that the plasma chamber 607 and the protection tube 620 are tubular in shape (Figure 1), with the protection tube inserted in the plasma chamber. The combination of AAPA and Carpenter et al. teaches that the plurality of pieces are tubular members disposed in an axial direction of the protection tube to comprise the protection tube.

In regards to Claim 3, the recitation that each of the plurality of pieces is shorter in length than a piece disposed at a location where a gradient of temperatures at a time of plasma processing is smaller is a process limitation. The gradient of temperatures will be dependent on the plasma that is generated. The combination of AAPA and Carpenter et al. teaches that each of the plurality of pieces comprising the protection tube can vary in length. The pieces would be capable of being arranged in accordance with any gradient in temperatures generated by the plasma. It has been held that a claim containing a "recitation with respect to the manner in which a claimed apparatus

is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

In regards to Claim 6, AAPA teaches that the protection tube is made of quartz.  
(Specification, Page 4, Line 1)

In regards to Claims 7 and 8, AAPA teaches that the apparatus is an electron cyclotron resonance plasma apparatus that subjects the sample to sputtering.  
(Specification, Page 2, Line 2)

**4. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Carpenter et al. as applied to claim 1 above, and further in view of U.S. Patent 6,797,639 to Carducci et al.**

The teachings of AAPA and Carpenter et al. were discussed above.

In regards to Claims 4 and 5, the combination of AAPA and Carpenter et al. does not expressly teach that the protection tube is provided with a plurality of grooves on the inner wall thereof in parallel with an axis of the protection tube at substantially equal circumferential intervals (i.e. evenly spaced longitudinal grooves).

Carducci et al. teaches that a protection tube 118 can be provided with evenly spaced longitudinal grooves 1810. (Figure 20; Column 18, Lines 1-2)

It would have been obvious to one of ordinary skill in the art to modify the combination of AAPA and Carpenter et al. to provide the protection tube with a plurality of evenly spaced longitudinal grooves on the inner wall thereof. The motivation for making such a modification, as taught by Carducci et al. (Column 16, Line 33 - Column

17, Line 39), would have been to increase adhesion of deposited films on the protection tube and thereby reducing flaking of such films into the chamber and subsequent substrate contamination or damage.

**5. Claims 9-13 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Carpenter et al. as applied to claims 1-3 and 6-8 above, and further in view of U.S. Patent 6,408,786 to Kennedy et al.**

The teachings of AAPA and Carpenter et al. were discussed above.

In regards to Claims 9 and 10, the combination of AAPA and Carpenter et al. does not expressly teach that the plasma is an inductively coupled plasma or a helicon wave plasma.

Kennedy et al. teaches that ECR, inductive coupling, and helicon wave are equivalent means of generating plasma.

It would have been obvious to one of ordinary skill in the art to select any of ECR, inductive coupling, or helicon wave as art-recognized equivalent means to generate a plasma. It has been held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982).

In regards to Claim 11, the combination of AAPA and Carpenter et al. does not expressly teach that the protection tube can be disposed in the sample chamber.

Kennedy et al. teaches that a protection tube 20 can be disposed in a sample chamber 2.

It would have been obvious to one of ordinary skill in the art to modify the apparatus taught by the combination of AAPA and Carpenter et al. to dispose the protection tube in the sample chamber. The motivation for doing so, as taught by Kennedy et al. (Column 1, Lines 56-58), would have been to protect the walls of the *sample* chamber.

In regards to Claims 12 and 13, see the discussion of Claims 2 and 3 above.

In regards to Claim 16, see the discussion of Claim 6 above.

In regards to Claims 17 and 18, the apparatus taught by combination of AAPA, Carpenter et al., and Kennedy et al. would be inherently capable of subjecting the sample to etching or chemical vapor deposition, based on the process conditions. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claim 19, see the discussion of Claim 8 above.

In regards to Claims 20 and 21, see the discussion of Claims 9 and 10 above.

**6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Carpenter et al., and further in view of Kennedy et al. as applied to claim 11 above, and further in view of Carducci et al.**

The teachings of AAPA, Carpenter et al., and Kennedy et al. were discussed above.

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In regards to Claims 14 and 15, the combination of AAPA, Carpenter et al., and Kennedy et al. does not expressly teach that the protection tube is provided with a plurality of grooves on the inner wall thereof in parallel with an axis of the protection tube at substantially equal circumferential intervals (i.e. evenly spaced longitudinal grooves).

Carducci et al. teaches that a protection tube 118 can be provided with evenly spaced longitudinal grooves 1810. (Figure 20; Column 18, Lines 1-2)

It would have been obvious to one of ordinary skill in the art to modify the combination of AAPA, Carpenter et al., and Kennedy et al. to provide the protection tube with a plurality of evenly spaced longitudinal grooves on the inner wall thereof. The motivation for making such a modification, as taught by Carducci et al. (Column 16, Line 33 - Column 17, Line 39), would have been to increase adhesion of deposited films on the protection tube and thereby reducing flaking of such films into the chamber and subsequent substrate contamination or damage.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone



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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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